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User manual for the MIKM consistency application

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Defence R&D Canada – Atlantic

Contract Report
DRDC Atlantic CR 2010-056
July 2010

Canada

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Abstract

A service oriented architecture is used to construct a set of web services that interface to applications previously created by the Maritime Information and Knowledge Management group at DRDC Atlantic. The services link the Automated Ship Image Acquisition System (ASIA) and the SeaSpider application. This report describes the functionality provided to the user. A Google Earth based interface allows a user to interact with the services. The Query interface allows a user to search the data sources based on ship name, call sign, time, etc. This manual also describes the results page and how the user can interact with the results page and the Google Earth view of the results.

Résumé

On utilise une architecture orientée service pour créer un ensemble de services Web connectés aux applications créées par le groupe de Gestion de l'information et du savoir maritimes (GISM) de RDDC Atlantique. Ces services créent un lien entre le système d'acquisition automatisée d'images de navires (ASIA) et l'application SeaSpider. Ce rapport décrit les fonctions offertes aux utilisateurs. Une interface fondée sur Google Earth permet aux utilisateurs d'utiliser les services. L'interface de recherche (<<Query>>) permet aux utilisateurs de chercher dans les sources de données à partir de critères comme, notamment, le nom du navire, l'indicatif d'appel et l'heure. Ce guide explique la page des résultats, l'interaction de l'utilisateur avec cette page et l'affichage des résultats dans Google Earth.

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Executive summary

User manual for the MIKM consistency application

Marie-Odette St-Hilaire; DRDC Atlantic CR 2010-056; Defence R&D Canada –
Atlantic; July 2010.

Background: The collection of data and information to support Maritime domain aware-
ness (MDA) can take on many forms. In the Maritime Information and Knowledge Man-
agement group at DRDC Atlantic, the Automated Ship Image Acquisition System (ASIA)
acquires photographs of ships as they transit the narrows of Halifax Harbour. The Sea-
Spider application supports MDA via the accumulation of web-based information on ship
routes. A cross-comparison of the information available from the two data sources enables
an assessment of the information consistency.

Results: The software known as the consistency application was constructed under con-
tract by OODA Technologies over a period of seven months, in support of the Applied Re-
search Project 11HL *Technologies for Trusted Maritime Situational Awareness*. The user
interface to the consistency application is described in this document. The consistency ap-
plication allows users to query data from the two data sources using ship name, call sign,
time, etc. The results of the query are displayed in a web browser using a Google Earth
plugin.

Significance: The user manual provides clear description of how to interact with the con-
sistency application. The consistency application itself, allows a researcher to cross com-
pare the information from multiple data sources and generate a comparison score for the
individual ship information and also for the data sources as a unit. Such a score allows the
researcher to assess the capability of the data source to provide meaningful information for
MDA purposes. This will allow the identification of those sources that provide the most
reliable information for MDA purposes.

Future Plans: The intent is to include additional data sources in the consistency applica-
tion. This will increase the data available for cross comparison. In turn, this will increase
the likelihood of identifying poor data and poor data sources.

Sommaire

User manual for the MIKM consistency application

Marie-Odette St-Hilaire ; DRDC Atlantic CR 2010-056 ; R & D pour la défense Canada – Atlantique ; juillet 2010.

Contexte : La cueillette de données et d'information pour appuyer la connaissance de la situation dans le secteur maritime (CSSM) peut revêtir différentes formes. Dans le groupe de Gestion de l'information et du savoir maritimes (GISM) de RDDC Atlantique, le système d'acquisition automatisée d'images de navires (ASIA) obtient des photographies de navires de passage dans le port de Halifax. L'application SeaSpider appuie la CSSM en accumulant de l'information trouvée sur le Web sur les itinéraires des navires. Une comparaison croisée de l'information provenant des deux sources permet d'en évaluer l'uniformité.

Résultats : Le logiciel connu sous le nom d'application d'uniformisation a été créé, dans le cadre d'un contrat octroyé à OODA Technologies sur une période de sept mois, pour appuyer le projet de recherches appliquées 11HL des technologies assurant la fiabilité de la connaissance de la situation maritime (11hl). L'interface utilisateur de l'application d'uniformisation est décrite dans ce document. L'application d'uniformisation permet aux utilisateurs de chercher des données dans deux sources de données à partir de critères comme, notamment, le nom du navire, l'indicatif d'appel et l'heure. Les résultats s'affichent dans un navigateur Web au moyen d'un plugiciel Google Earth.

Importance : Le guide de l'utilisateur explique clairement comment interagir avec l'application d'uniformisation. L'application d'uniformisation, quant à elle, permet à un chercheur de comparer l'information provenant de diverses sources de données et de générer des notes de comparaison pour l'information de chaque navire et les sources de données comme unités. Ces notes permettent au chercheur d'évaluer la capacité des bases de données à fournir de l'information utile répondant aux objectifs de la CSSM. Ceci lui permet d'identifier les sources qui fournissent l'information la plus fiable aux fins de la CSSM.

Perspectives : Le but est d'inclure des sources de données supplémentaires dans l'application d'uniformisation. La quantité de données disponibles pour la comparaison croisée augmentera, tout comme la probabilité que l'on puisse identifier les sources de données et les données de moindre qualité.

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1 Scope

This document describes in detail the steps necessary to use the Consistency Application (CA) web client. The role of each page of the user interface is described and a description of each action button is provided.

The installation of the software required to run the Compare MDA prototype is described in the Installation and Developer Guide. At this level, it is assumed that Firefox and GE Application programming interface (API) are installed and that the web archive of the CA web client is deployed in an up and running web container.

2 Starting Consistency Application Web Client

In order to graphically display the CA web client, enter the endpoint location of the web client in the address bar of Firefox browser. The endpoint has the following structure: `http://IP:port/comparemda/`, where *IP* is the full Internet Protocol (IP) of the computer where the CA web client is deployed (can also be `localhost`) and *port* is the web container port, usually 8080, but not restricted to that value.

The client is ready to use when the GE application is loaded.

The client's visual aspect at initialization is shown in Figure 1. Main components of the application are:
– Google Earth 3D display
– Color Legend
– Query page link
– Browse Results page link
– Consistency Statistics page link

These components, highlighted in yellow in Figure 1, are always part of the display. The starting page is the *Query* page.

The remainder of this document describes the role of each page (*Query*, *Browse Results*, *Consistency Statistics* and *Admin*) and the functionality of the page.
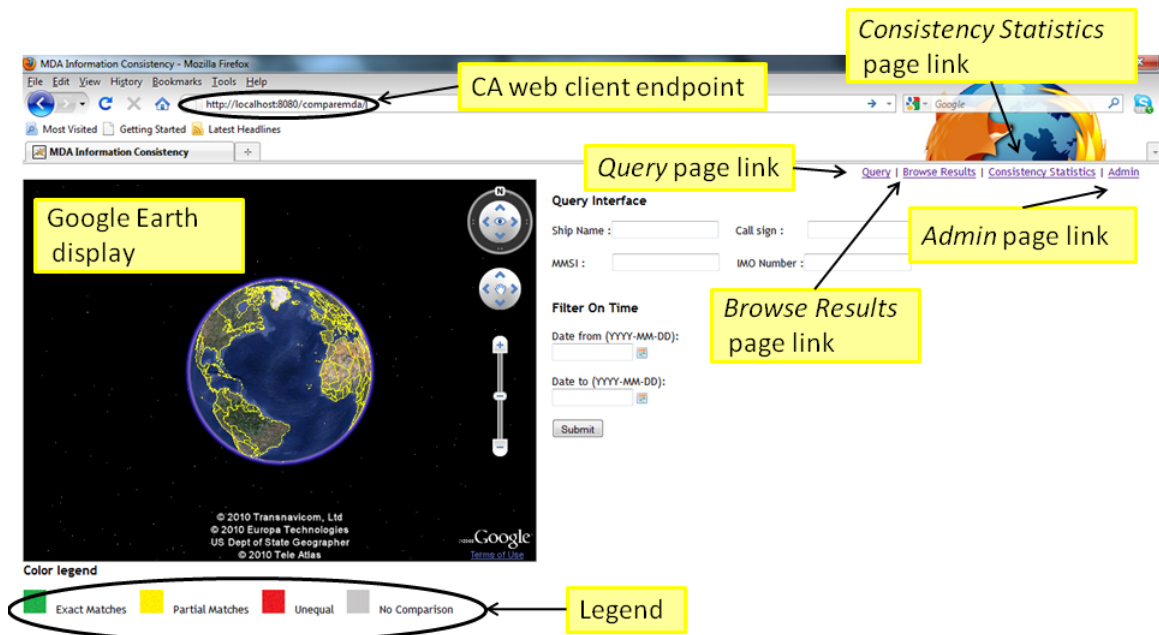
Figure 1: *CA web client's visual aspect at initialization. Using the Query interface, a user can query the database based on specific ship metadata. If available, the ship's location is then displayed in the Google Earth display window.*

3 Query Page
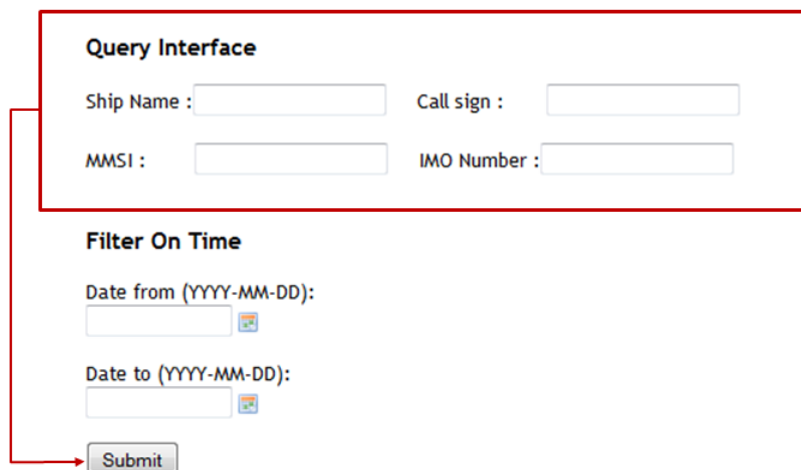
This section describes the functionality of the *Query* page.

To access the *Query* page, click on the Query page link, in the upper right corner of the application.

The *Query* page is divided into three sections: *Query Interface* and *Filter On Time*. The following describes each of these sections and their functionality.

3.1 Query Interface

The *Query Interface* (see Figure 2) is used to filter CA results to be displayed. Filtering can be done on the ship name, the call sign, the Maritime Mobile Service Identity (MMSI) number and the International Maritime Organization (IMO) number.

Figure 2: Query interface used to filter the results of the Consistency Application to be displayed by the client.

3.1.1 Ship Name Text Box

To filter CA results on ship name, enter the ship name, or a part of it, in the *Ship Name* text box. All comparison results having at least one ship with a name matching the input string will be selected. A ship name is matching the input string if it contains (anywhere) that string. For instance, if the input string is "the", the return set will include ships names like: "the cat" and "Loethe".

The wildcard "*" is also accepted at the beginning and end of an input string, but is not required. For instance, the input ship name "*oocl*" will produce the same results as "oocl", i.e., it will return all CA comparison results including at least one ship having a name matching the input string "oocl". Entering only the wildcard "*" has the same effect as leaving the text box blank: it means that all ship names are accepted, i.e., there is no filter on name.

The filtering on ship name is not case sensitive.

3.1.2 Call sign Text Box

To filter CA results on call sign, enter the call sign, or a part of it, in the *Call sign* text box. All comparison results with at least one ship having a call sign matching the input string will be selected. A call sign is a match to the input string if the call sign contains (anywhere) the input string. For instance, if the input string is "Z", the return set may include return ships with the following call signs: "ELJZ4", "HOLZ" and "ZSDN".

The wildcard "*" is also accepted at the beginning and end of an input string, but is not required. For instance, the input call sign "*DN*" will produce the same results as "DN", i.e., it will return all CA results including at least one ship having a call sign matching the input string "DN". Entering only the wildcard "*" has the same effect as leaving the text box blank: it means that all call signs are accepted, i.e., there is no filter on call sign.

The filtering on call sign is not case sensitive.

3.1.3 MMSI Text Box

To filter CA results on MMSI, enter the MMSI, or a part of it, in the *MMSI* text box. All comparison results having at least one ship with a MMSI matching the input string will be selected. A MMSI is a match to the input string if the MMSI contains (anywhere) the input string. For instance, if the input string is "21", the return set may include ships with the following MMSI: "212610000", "311213000" and "636090921".

The wildcard "*" is also accepted at the beginning and end of an input string, but is not required. For instance, the input MMSI "*33*" will produce the same results as "33". Entering only the wildcard "*" has the same effect of leaving the text box blank: it means that all MMSI are accepted, i.e., there is no filter on MMSI.

The filtering on MMSI is not case sensitive.

3.1.4 IMO Number Text Box

To filter CA results on IMO number, enter the IMO number, or a part of it, in the *IMO Number* text box. All comparison results having at least one ship with an IMO number matching the input string will be selected. An IMO number is a match to the input string if the IMO number contains (anywhere) the input string. For instance, if the input string is "937", the return set may include ships with the following IMO: "9193745" and "9378591".

The wildcard "*" is also accepted at the beginning and end of an input string, but is not required. For instance, the input IMO number "*456*" will produce the same results as "456". Entering only the wildcard "*" has the same effect as leaving the text box blank: it means that all IMO numbers are accepted, i.e., there is no filter on IMO number.

3.1.5 Submit Button

Clicking the *Submit* button will send the query to the CA. The returned results will match the input query, as described in sections 3.1.1 to 3.1.4.

The query parameters are connected with the "AND" operator. For instance, if the value entered in the *Ship Name* text box is "sea" and the value in the *Call sign* text box is "AB", then the query response will only contain ships with a ship name containing the string "sea" and the call sign containing the string "AB".

CA comparison results include information from multiple sources about a ship. When a single query is made, each data source is queried based on the filter criteria. Each source will then return the result set that complies with the filter criteria. However, each returned set from each data source is then used to link to information from the other sources. This linking can result in the information appearing as not compliant with the initial filter criteria. Another result of this filtering and linking, is that at least one ship listed in the return set will comply with the full search criteria.

If the CA web service takes more than one minute to complete its response, a pop-up window is displayed (see Figure 3), asking the user to refine the query. The same pop-up window appears when the query response includes more than 150 ships. In that case, CA web service sends a message asking the user to refine the query. The response is limited to 150 ships to avoid overhead or security problems.

If there are no CA results matching the query parameters, a pop-up window is displayed (see Figure 4).

Note

A click on the Submit button also sends a query to the CA web service to refresh the consistency statistics, with the input date of the Filter On Time. See section 3.2 for details.
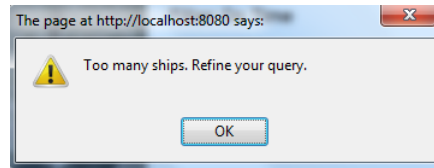
Figure 3: Pop-up window appearing when the CA takes too much time to send its response or if the response is too large.
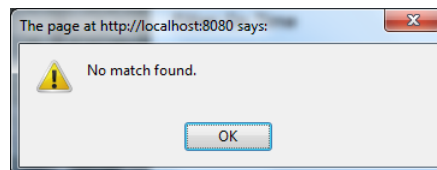
Figure 4: Pop-up window appearing when the CA has no result matching the query parameters.

3.2   Filter On Time

The *Filter On Time* interface (see Figure 5) has two roles:

1. Filter the comparison results of the CA.
2. Filter the source statistics.

The first function of the *filter on time* is to filter ships recorded in the CA at a date corresponding to the input time window (time interval where the lower bound is *Date from* and the upper bound is *Date to*). This time stamp corresponds to the date that the information about the ship was recorded by the source reporting it. The second function is to give a time frame for the computation of consistency statistics. Only comparison results including at least one ship within the input time windows are computed in the statistics.

3.2.1   Date From Text Box

To filter the CA results on time, enter a date corresponding to the lower bound of a time window. The date can be typed or selected using the date selector.

If the date is typed into the text box, it must be in the format "YYYY-MM-DD". If the date is entered with any other format, the "No match" pop-up window shown in Figure 4

Figure 5: *Filter On Time interface used to filter the results of the Consistency Application and the consistency statistics to be displayed by the client.*

will be displayed after the user clicks on the *Submit* button.

To use the date selector, click on the calendar icon to the right side of the text box. Navigate in the calendar (see Figure 6) using the top arrows and select a date by clicking on the specific day in the month.

The filter includes the entered date (i.e., is inclusive), meaning that the results may include ships with *Date from* as the time stamp.

Figure 6: *Date selector interface. Click on the box containing the day number to select that specific day.*

3.2.2   Date To Text Box

To filter the CA results on time, enter a date corresponding to the upper bound of a time window. The date can be typed or selected using the date selector.

If the date is typed into the text box, it must be in the format "YYYY-MM-DD". If the date is entered with any other format, the "No match" pop-up window shown in Figure 4 will be displayed after the user clicks on the *Submit* button.

To use the date selector, click on the calendar icon to the right side of the text box. Navigate in the calendar (see Figure 6) using the top arrows and select a date by clicking on the specific day in the month.

The filter includes the entered date (i.e., is inclusive), meaning that the results may include

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ships with *Date to* as the time stamp.

3.2.3 Submit Button

As mentioned in section 3.1, clicking on the *Submit* button will send the query specified by the input parameters of the *Query Interface* and the *Filter On Time* interface to the CA. It will also send a request to the CA web service to refresh the consistency statistics according to the input dates.

It is possible to enter only one date in the *Filter On Time* interface. If the entered date is contained in the *Date from* text box, then the filter time window will be [Date from, the now time]. If the entered date is contained in the *Date to* text box, then the filter time window will be [1970-01-01, Date to].

CA comparison results include information from multiple sources about a ship. When a single query is made, each data source is queried based on the filter criteria. Each source will then return the result set that complies with the filter criteria. However, each returned set from each data source is then used to link to information from the other sources. This linking can result in the information appearing as not compliant with the initial filter criteria. Another result of this filtering and linking, is that at least one ship listed in the return set will comply with the full search criteria.

Note 1

It is possible to send a query only on the date, without any parameter selected in the *Query Interface*. In that case, filtering will be made only on time.

Note 2

The *Filter On Time* query parameters are connected to the *Query Interface* parameters with the "AND" operator. For instance, if the value entered in the *Ship Name* text box is "oocl" and the value in the *Date from* is 2009-01-01, then the query responses will only contain results with ships recorded by their sources after 2009-01-01 (inclusive) and with name matching the string "oocl".

4   Browse Results Page

This section describes the functionality of the *Browse Results* page.

To access the *Browse Results* page, click on the Browse Results page link, in the upper right corner of the application.

At initialization, the *Browse Results* page is empty. The purpose of this page is to browse the results of a query (sent when the *Submit* button of the *Query* page is clicked). Once a query response is received, the *Browse Results* page is divided into two sections: *Ship List* and *Comparison Window*. The following describes each of these sections and their functionalities.

4.1   Ship List

Once a query response is received, an interactive list of ships satisfying the query parameters is displayed at the center of the *Browse Results* page (see Figure 7).
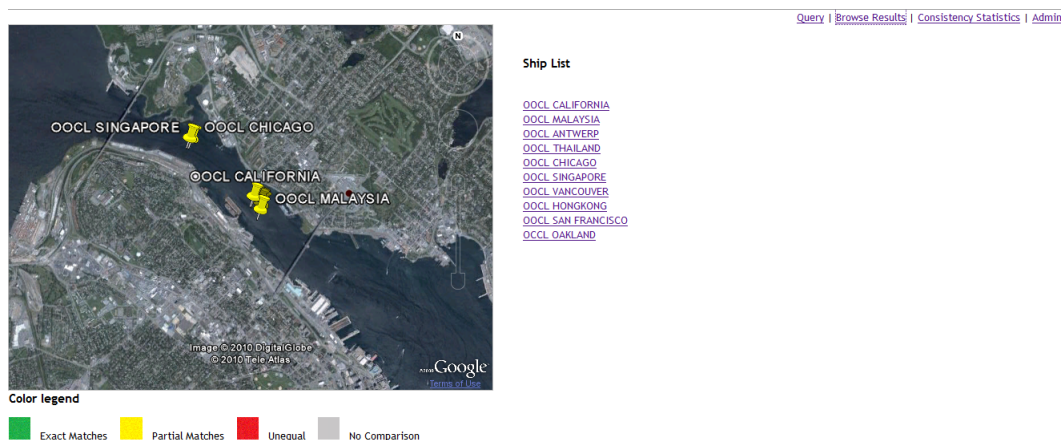
Figure 7: *Browse Results page when the response of a query is received. Each ship name in the list is a link to additional ship information.*

4.2   Comparison Window

Clicking on a ship name in the *Ship List* opens the *Comparison Window* (see Figure 8). The *Comparison Window* is divided into four main sections: *Expand* and *Compress* buttons, *Ship Image*, *Item Table*, *Previous* and *Next* buttons.
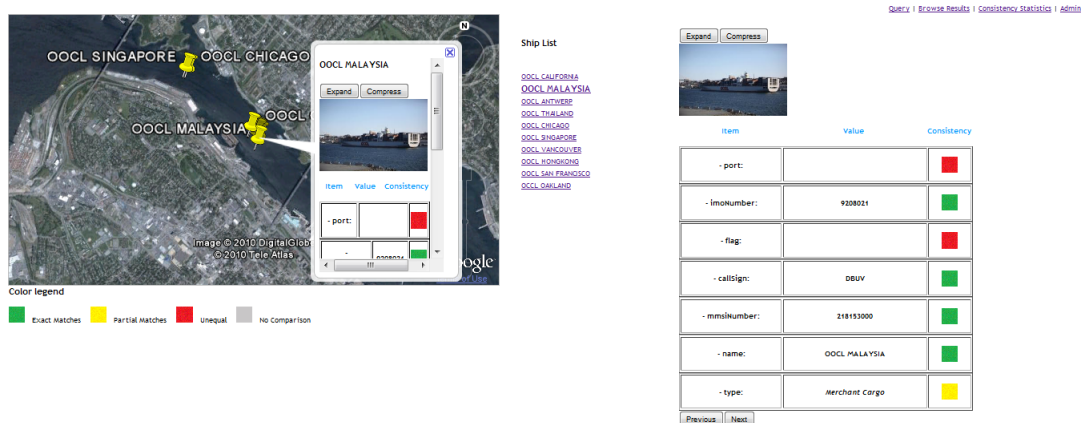
Figure 8: *Browse Results page when a name in the Ship list is selected. The right part of the display is the Comparison Window.*

4.2.1 Expand and Compress Buttons

Clicking on the *Expand* button allows the user to see all the information available for the ship, as contained in the Item Table in the database. The expanded Item Table on the web page shows all values for each source with their match score.

Clicking on the *Compress* button allows the user to see the summary of the information contained in the Item Table. The compressed table shows the item values with a global value, if it exists, and the consistency among sources, if any.

4.2.2 Ship Image

When the ship image is available, it is located beneath the *Expand*/*Compress* buttons. The ship image is provided by ASIA.

4.2.3 Item Table on the Web Page

The *Item Table* includes all data item values for a ship, for each source. The table is made up of three columns: Item, Value and Consistency. The rows of the table can be either expanded or compressed. The default view is compressed.

 The expanded view is illustrated in Figure 9. The table's components that are exclusive to the expanded view are marked in blue. These components are: the source name, the value for the given ship item, and the match score. The value *N/A* means that the source provides no value for the given ship item, and therefore there is no match assessed.

The match score is a normalized score quantifying the source's ability to provide consistent

Figure 9: *Expanded view of the Item Table on the web page. Elements encompassed with a blue oval are exclusively displayed in the expanded view, while the brown oval indicates elements that are also displayed in the compressed view.*

information about a given item, as compared to the other sources. For each ship, a match score is thus assigned for each source, for each data item. This match score quantifies the ability of a source to provide a data item value that can be confirmed by other sources. See [1] for details about the match. If only one source provides information for a given ship item, then no match is assigned to this source because comparison with other sources is not possible. In that case, the value *N/A* is displayed for the source.

The table components marked by a brown oval in Figure 9 are displayed in both the compressed and expanded mode: Item's name, global value and source consistency.

4.2.3.1 Traffic Lights Visualization

The consistency among sources is represented by a traffic light visualization: the colors red, yellow or green. The consistency among sources is an assessment of how well sources agree on the information they provide for the given item. What is referred to in the web client as the *consistency* is an averaged value of all source matches, for a given item, for a given ship. This consistency score approximates the percentage of sources providing the same information, for the given item and ship.

Formally, the color for the traffic lights are assigned with the following rule:

Green Exact Matches: Consistency $\geq 80\%$

Yellow Partial Matches: $20\% < $ Consistency $ < 80\%$

Red Unequal: Consistency $\leq 20\%$

Gray No consistency assessed because only one source provides information for that ship's item.

4.2.3.2 Global Value

The global value is the value assigned to a particular ship item, taking into account all source values. The following rules are applied to the assignment of a global value:

1. When the consistency among sources is assessed to be red, no global value is displayed.
2. When there is no source consistency, meaning that only one source provides information for that ship item, then the global value is the value from that single source.
3. Otherwise, the global value is the value provided by the source having the highest match score. If more than one source shares the same highest match score and if the Authoritative Source (AS) is among these sources, then the global value is the one provided by the AS. In the unlikely event that more than one source shares the same highest match score and the AS is not one of those sources, then the global value is obtained from one of the sources with the highest score.

When the source consistency is marked as yellow, the global value is rendered in italics. This is intended to indicate that this global value may be erroneous. When the color assigned to the source consistency is green, the value is rendered with normal capital letters. This indicates the global value is most likely the real item value.

Note

When clicking on an item's name, the row expands to show all source names and associated values and matches. Clicking again on the item's name compresses the row to its initial state.

4.2.4 Previous and Next Buttons

Clicking on the *Previous* button changes the content of the Comparison Window to display the information about the previous ship in the *Ship List*. If the *Comparison Window* displays the information about the first ship in the *Ship List*, then clicking on the *Previous* button has no effect.

Clicking on the *Next* button changes the content of the Comparison Window to display the information about the next ship in the *Ship List*. If the *Comparison Window* displays the information about the last ship in the *Ship List*, then clicking on the *Next* button has no effect.

4.3   Interaction with Google Earth display

All ships in the *Ship List* having a known position are displayed on the GE display, i.e., if one source has information about the ship position, this ship location is marked on the GE display with a placemark (see GE display in Figure 7). It is possible to visualize ship information and comparison results by clicking on its placemark. See Section 7 for details about GE 3D display usage.

When clicking on a name in the *Ship List*, if one source has information about the ship position, then the ship information is displayed in a *balloon* on the GE display (see GE display in Figure 8). The information contained in the *balloon* is exactly the same as in the *Comparison Window*, except that there is no *Previous*/*Next* buttons. When clicking on another ship name, the bubble is either refreshed with the new ship information or is closed. The *balloon* closes when there is no information about the position available.

Clicking on placemarks on the GE display does not influence the *Comparison Window* content.

Note

In the default CA settings, the only source providing the ship's position is ASIA.

5 Consistency Statistics Page

This section describes the functionality of the *Consistency Statistics* page.

To access the *Consistency Statistics* page, click on the Consistency Statistics page link, in the upper right corner of the application.

The *Consistency Statistics* page (see Figure 10) contains the *Source Consistency Table* and the *Refresh* button.

Source Consistency

Item	asia (%)	seaspider (%)	itu (%)
port	72	72	N/A
imoNumber	95	N/A	95
flag	N/A	77	77
callSign	96	N/A	96
mmsiNumber	98	N/A	98
name	87	97	97
type	39	71	70
Total	81	79	89

Number of ships : 856

Color legend

Exact Matches   Partial Matches   Unequal   No Comparison
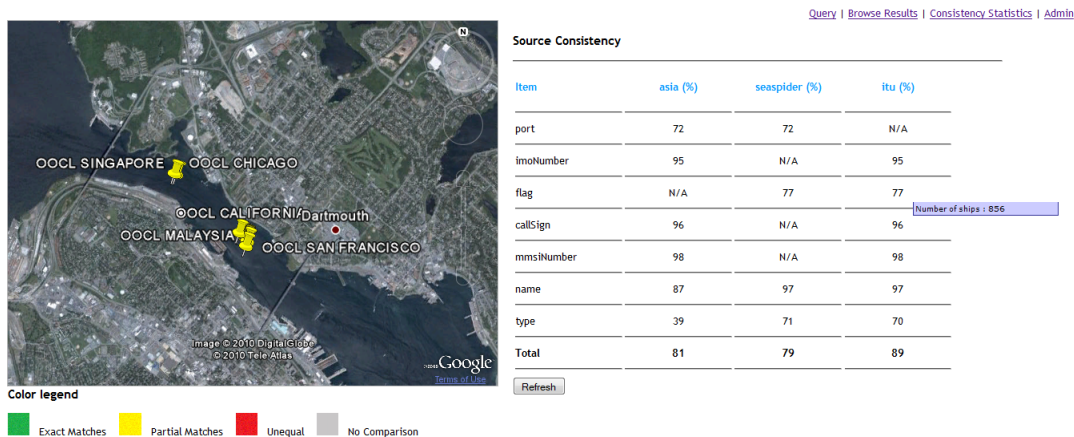
Figure 10: *Consistency Statistics page. Each ship item is indicated in the table. Percent values are shown for each ship item, from the various data sources. The percentage represents the average of the source match scores over all ships for that particular ship item.*

5.1 Source Consistency Table

The Source Consistency table has a row for each ship item. Each data source has an accompanying column.

The intersection of the row (i.e., ship item) and the column (i.e., data source) contains a number, in percent, which represents the average of the source match scores over all ships. The number of ships used to compute this average is available when the mouse is on that statistic (see Figure 10 for the mouse over display, as shown in the purple box).

The "N/A" value means that this data item is not available for the source, and therefore no statistic can be computed for that item.

The *Total* row includes the average consistency for each source. This average is computed

over the source match scores for each item. It assesses a global consistency score for the source.

5.2 Refresh Button

Clicking on the *Refresh* button sends a query to the CA web service to re-evaluate the consistency statistics. If new comparisons are done by the CA, the table will not update automatically.

Note

Each time the *Submit* button is clicked on the *Query* page, the statistics table is updated.

6   Administration Page

This section describes the functionality of the *Administration* page.

To access the *Administration* page, click on the Admin page link, in the upper right corner of the application.

The *Administration* page (see Figure 11) contains the *Delete History* interface and the *Delete* button.
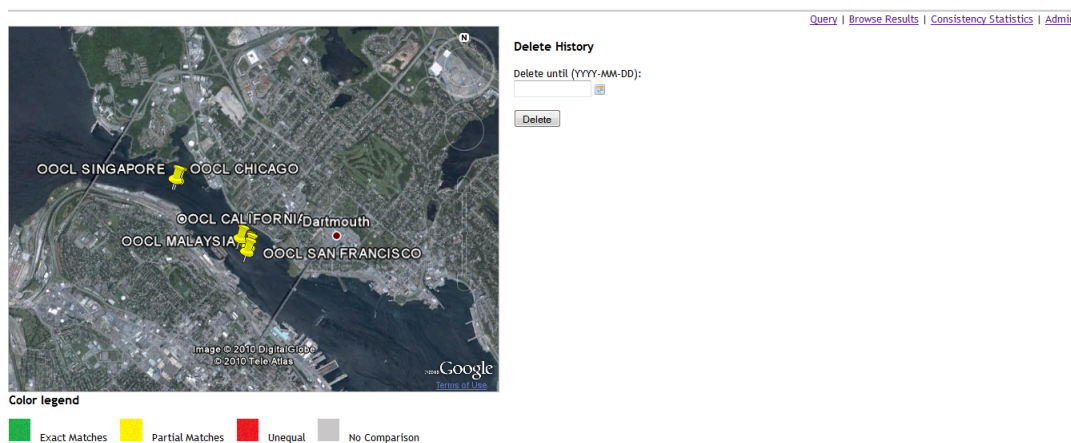
Figure 11: *Administration page with the Delete History interface.*

The *Delete History* interface is used to clean the CA Database (DB). Cleaning CA data is done by dropping information and comparison results implying a time stamp older than the input date.

6.1   Delete until Text Box

To delete old data, enter a date corresponding to the time stamp limit. All information and comparison results implying at least one source description with a time stamp older than the entered date *Delete until* will be deleted from the CA DB. The date can be typed or selected using the date selector.

If the date is typed into the text box, it must be in the format "YYYY-MM-DD". If the date is entered with any other format, the data will not be deleted.

To use the date selector, click the calendar icon on the right side of the text box. Navigate in the calendar (see Figure 6) using the top arrows and select a date.

The filter includes the entered date (i.e., inclusive), meaning that data with the entered date *Delete until* as the time stamp will be deleted.

6.2   Delete Button

Clicking on the *Delete* button will send a query to the CA web service to drop all information and comparison results recorded by its source before the date entered in the *Delete until* text box.

This action is definitive (i.e., it cannot be reversed). A pop-up window (see Figure 12) is displayed to confirm the action. If the *Cancel* button is clicked, the action is canceled. Otherwise, the query is sent to the server. In that case, no response is sent back. It may take a few minutes before the history is fully deleted. Dropping the data history will also impact the consistency statistics.
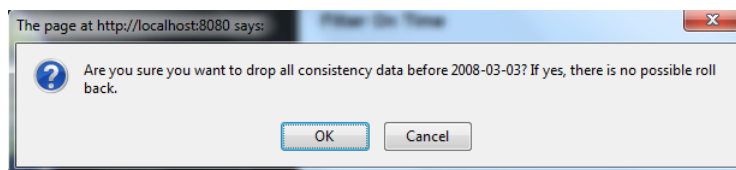
Figure 12: Warning pop-up window appearing when the Delete button is clicked.

7　Using Google Earth 3D

As mentioned in section 4.3, all ships satisfying the query parameters of the *Query Interface* having a known position are displayed on the GE display. Each ship is represented by a placemark on the GE display (see GE display in Figure 7).

By clicking on the pin that represents the specific ship, a description *balloon* pops up (as in Figure 8). This description contains the comparison results, the *Expand/Compress* buttons, and the ship image, if any.

If a large number of ships are displayed on a limited area, clicking on the placemarks cluster will display the underlying placemarks (see Figure 13).
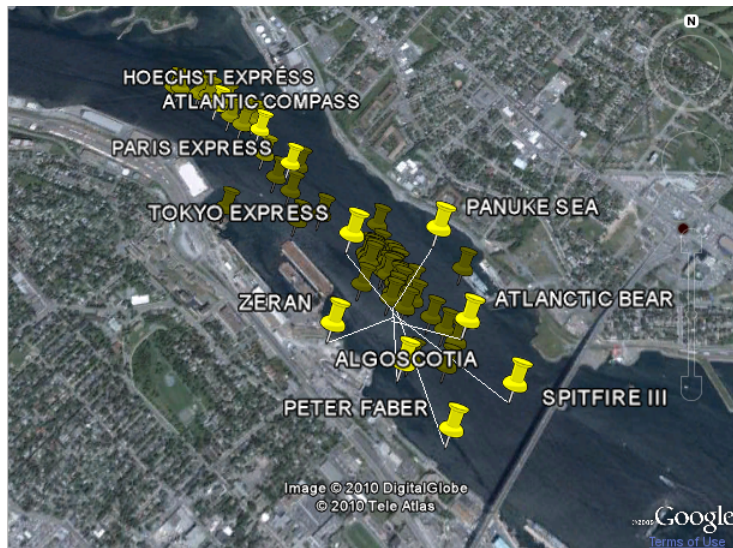
Figure 13: *Ships cluster on GE display. Clicking in the cluster displays the underlying ships.*

8   Troubleshooting

This section describes possible problems that may occur with the CA web client.

8.1   Results are not displayed/updated on the *Browse Results* page after more than a minute

Cause

Either the query was not correctly sent to the server or the web client can't connect properly to the CA web service. There may be many reasons for the latter cause.

Solution

1. Verify if it is possible that the new query produces the same *Ship List* that was produced from the previous query.

2. Click again (but just once) on the *Submit* button.

3. If the results are still not displayed/refreshed, examine the log files from the Tomcat server where the web client is deployed. Log files are located in `TOMCATHOME/logs`. Look first in the catalina file. This will provide information about the cause of the problem.

4. If memory reasons or java heap space are mentioned, then stop and restart the web server. If the java heap space error happens often, increase the Tomcat server heap space: Stop Tomcat server, set environment variable `CATALINA_OPTS` [1], and then restart Tomcat. Refer also to [2] for more instructions about Tomcat.

5. The machines where either the web services or one of the databases are located, may be off the network. Reset the connections, stop, then restart the Tomcat server.

6. One of the web servers, where other web services (i.e., not web client) are deployed, may have stopped or encounter an error. Stop and then restart that web server and restart the web client Tomcat server.

8.2   Statistics are not updated on the *Consistency Statistics* page after more than a minute

Cause

Either the query was not correctly sent to the server or the web client can't connect properly to the CA web service. There may be many reasons for the latter cause.

---

1. Follow instruction on `http://javahowto.blogspot.com/2006/06/6-common-errors-in-setting-java-heap.html`

Solution

1. Verify if it is possible that the new query produces exactly the same consistency statistics as compared to the previous query.

2. Click again (but just once) on the *Refresh* button.

3. If there is no refresh, try steps 3 to 6 from the previous solution.

References

[1] St-Hilaire, M.-O. (2010), Determining the consistency of information between multiple systems used in maritime domain awareness, (DRDC Atlantic CR 2010-056) Defence R&D Canada – Atlantic.

[2] M.-O. St-Hilaire, M. Mayrand (2010), Installation and Developer Guide for the MIKM Consistency Application, (DRDC Atlantic CR 2010-057) Defence R&D Canada – Atlantic.

List of symbols/abbreviations/acronyms/initialisms

API	Application Programming Interface
AS	Authoritative Source
CA	Consistency Application
DB	Database
GE	Google Earth
IMO	International Maritime Organization
IP	Internet Protocol
ITU	International Telecommunication Union
MDA	Maritime Domain Awareness
WS	Web Service

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A service oriented architecture is used to construct a set of web services that interface to applications previously created by the Maritime Information and Knowledge Management group at DRDC Atlantic. The services link the Automated Ship Image Acquisition System (ASIA) and the SeaSpider application. This report describes the functionality provided to the user. A Google Earth based interface allows a user to interact with the services. The Query interface allows a user to search the data sources based on ship name, call sign, time, etc. This manual also describes the results page and how the user can interact with the results page and the Google Earth view of the results.

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consistent information
multiple information sources
Automated Ship Image Acquisition system
ASIA
SeaSpider

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